

Options and their Potential to Impact Hydrology

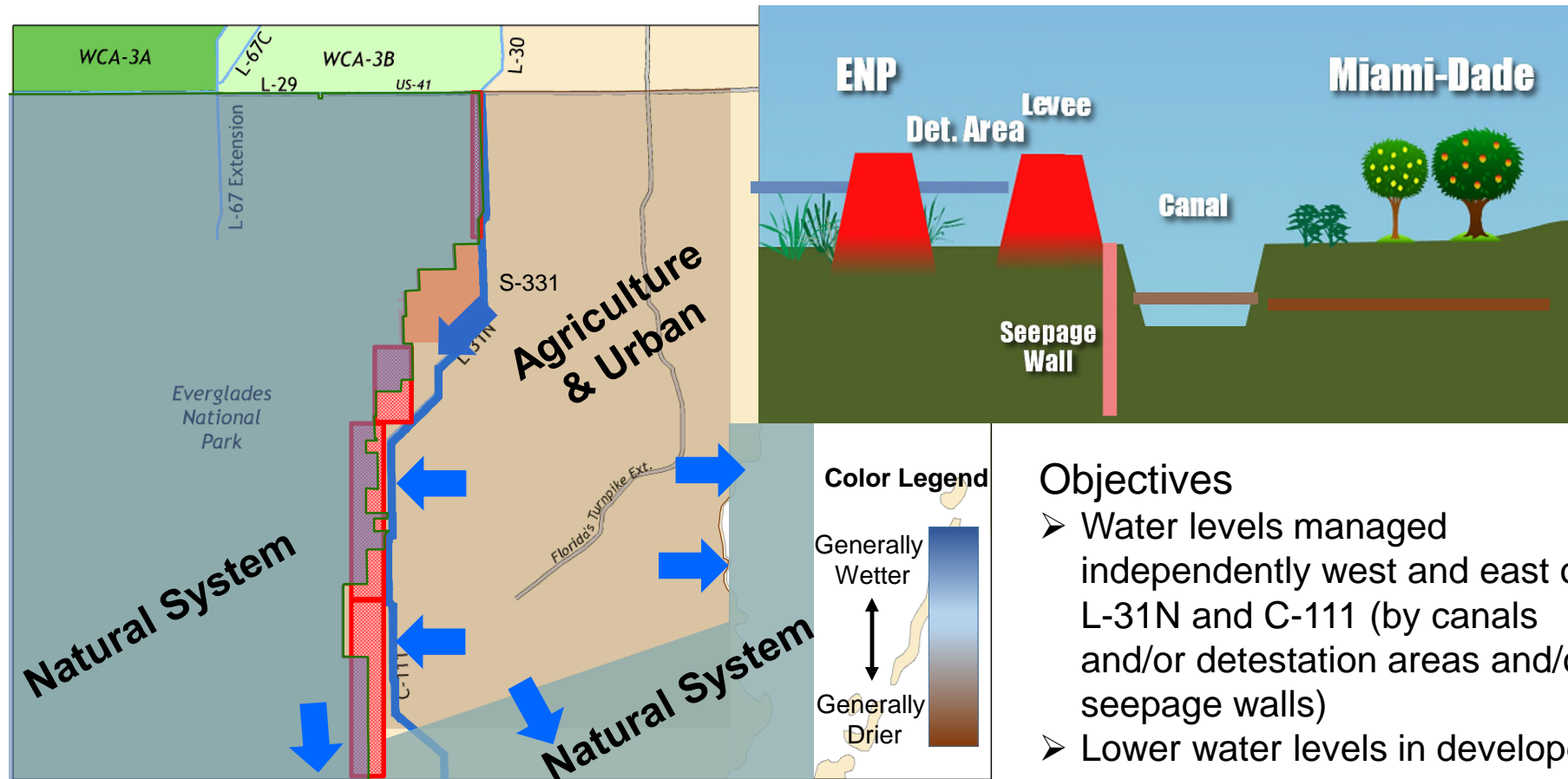
South Florida Water Management District
February 2, 2016

South Dade Investigations To Date

- The forum has provided an opportunity to understand goals in the South Dade area and expand our common understanding of water resource challenges and possible opportunities to improve conditions
- Discussions and early technical investigations identified a number of options for potential improvement
- Many of these options also identified risk to system resource management objectives
- Further technical efforts have realized the potential of improvements and reduced potential risks such that many robust combinations of options are feasible



South Dade: Defining the Challenge



Note: Graphics are conceptual and intended to show general performance, not all of the system details or variations in spatial performance.

Objectives

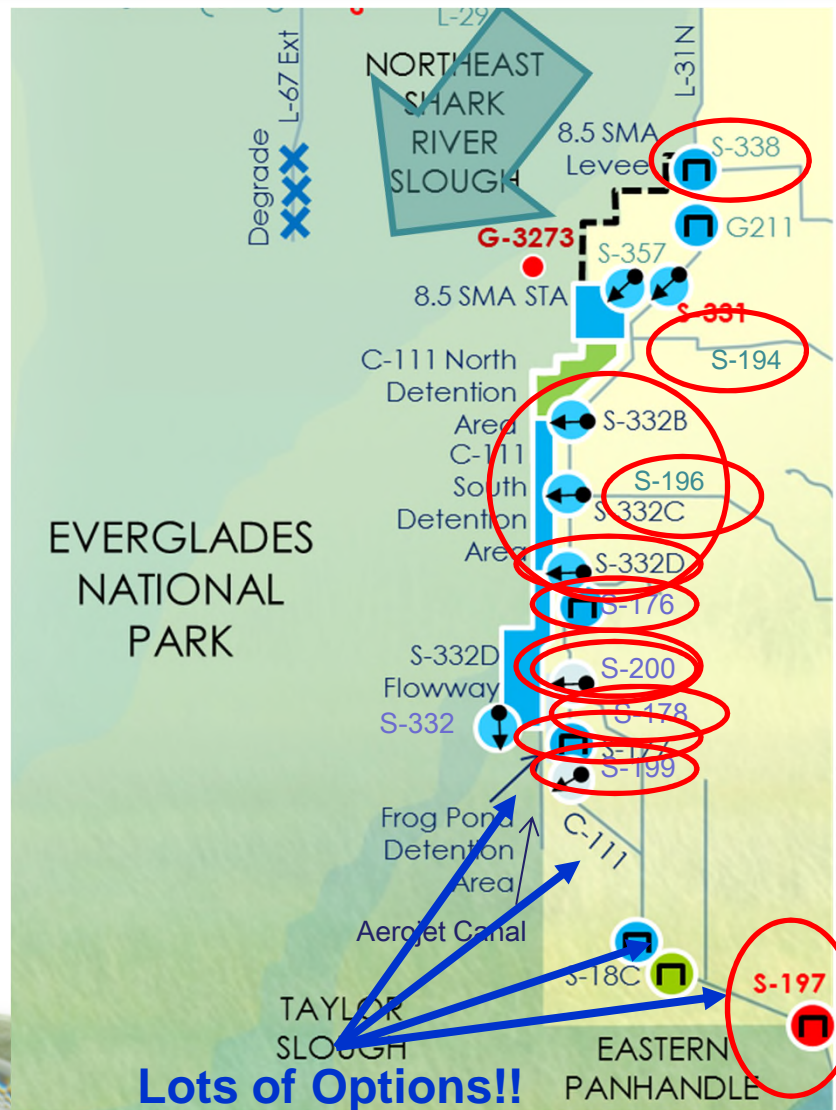
- Water levels managed independently west and east of L-31N and C-111 (by canals and/or detention areas and/or seepage walls)
- Lower water levels in developed areas
- Reduce flow at S-331 location, but provide flow to BNP, ENP and Florida Bay

Current Infrastructure & Getting Water Where Needed

Some dry season capacity available for L-31N pump stations (S-332 B,C,D); limited efficiency gains with surface water discharge

Some potential for improved discharges via S-332D and/or S-200 toward Taylor Slough

Limited dry season capacity for C-111 pump stations (S-200, S-199)



Some capacity to move water east toward Biscayne Bay via S-338, S-194, S-196

Capacity exists to utilize S-176 and S-177 more frequently

Limited options to convey more water near S-178

Capacity available at S-197. Releases can be undesirable



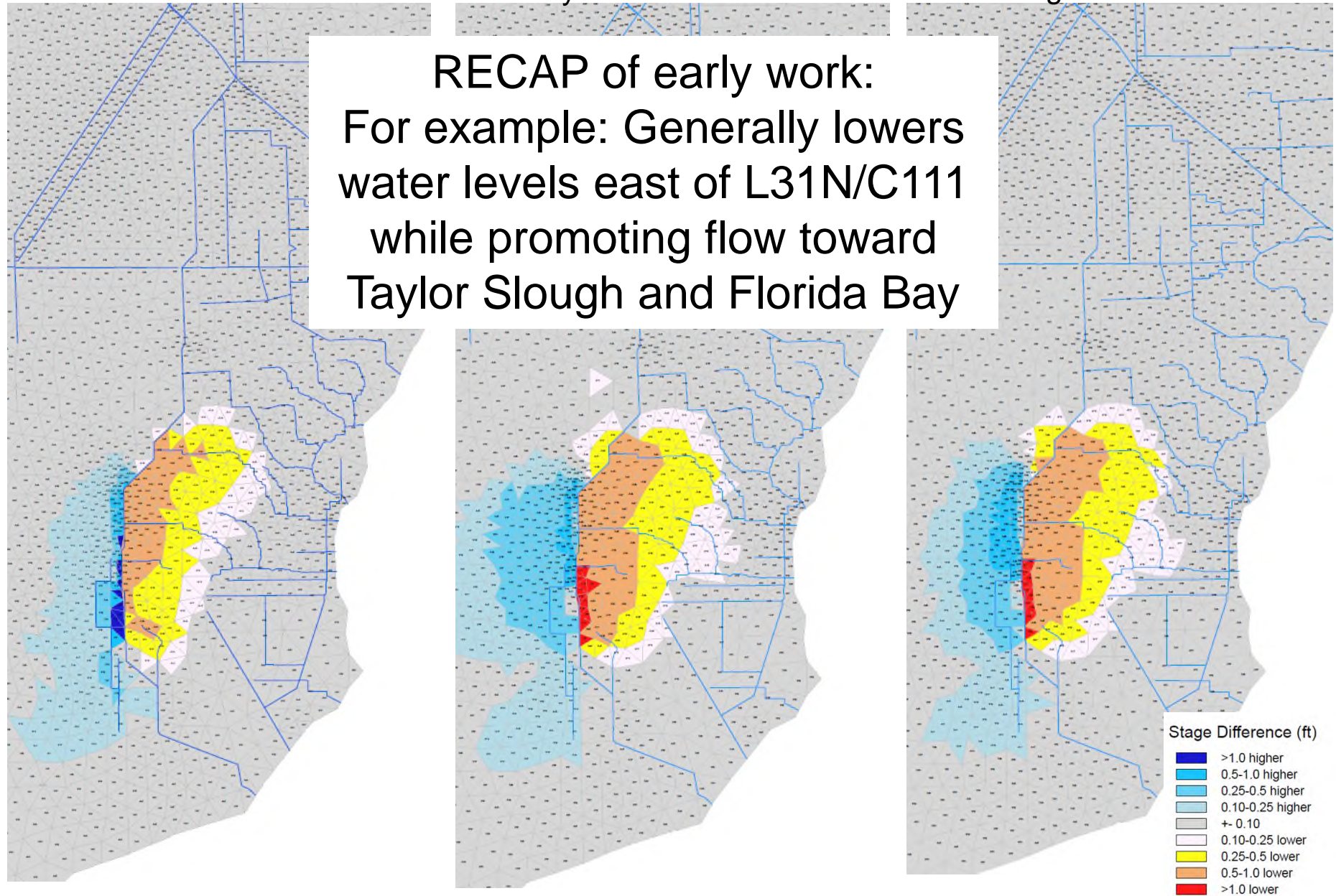
SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Wet: WY1970

Dry: WY1971

Average: WY1976

RECAP of early work:
For example: Generally lowers
water levels east of L31N/C111
while promoting flow toward
Taylor Slough and Florida Bay



Regional Evaluation of POC3: October Stage Difference Maps

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

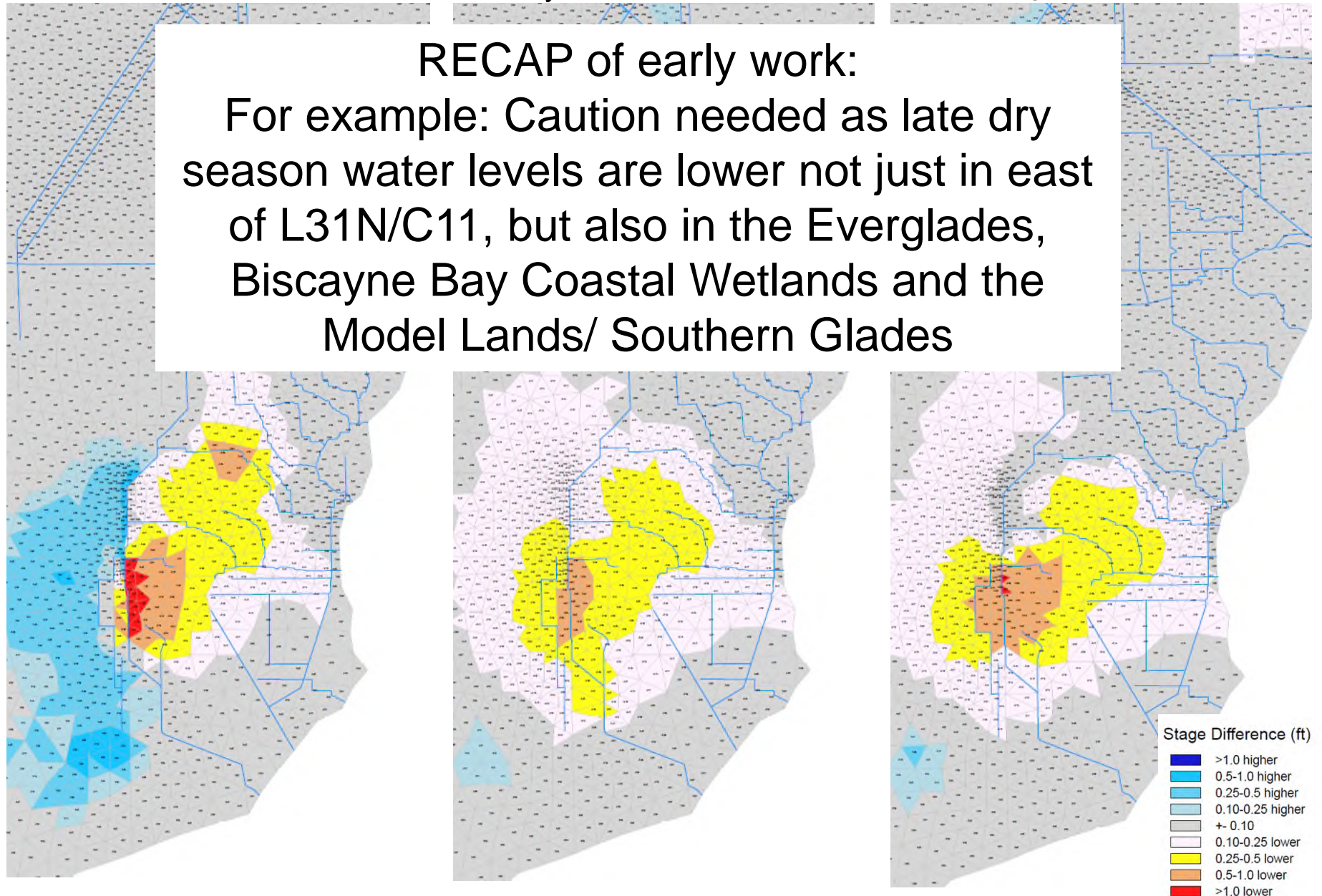
Wet: WY1970

Dry: WY1971

Average: WY1976

RECAP of early work:

For example: Caution needed as late dry season water levels are lower not just in east of L31N/C11, but also in the Everglades, Biscayne Bay Coastal Wetlands and the Model Lands/ Southern Glades



Regional Evaluation of POC3 : April Stage Diff Maps

DRAFT

South Dade Investigations – Turning The Corner

- Further technical efforts have realized the potential of proposed improvements and reduced potential risks such that many robust combinations of options are feasible
- The subsequent slides will demonstrate a combination of features that realize the intended trends in performance by reducing water levels in flooded agricultural areas while delivering water to and retaining water in natural systems.
- This example avoids unintended adverse impacts and provides insight into operational strategies that allow for robust performance improvements both independent of and as infrastructure improvements are realized.



Scenarios to Be Presented

Scenario "Step 2A0"

Similar to anticipated Increment 2 conditions

Includes:

Increment 1 operations

+ Contracts 8+8A

+ Raises L29 max stage to 8.5



Scenario "Step 2A3"

Includes Step 2A0 features, plus:

Lower operations at S332s, S199s and S200s for Aug-Dec and transition to current ops Jan1-Feb15

Additional unit with 75cfs each for S199 and S200

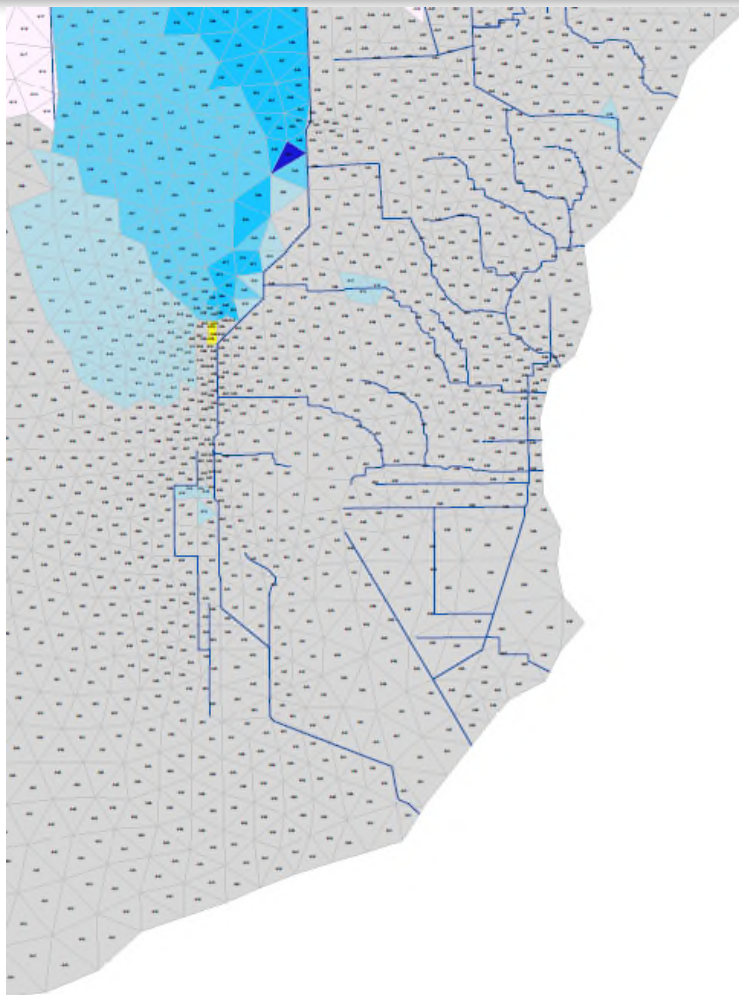
Revised operations to allow more frequent, lower capacity opening of S176 and S177

Infrastructure improvement to promote flows toward Taylor Slough

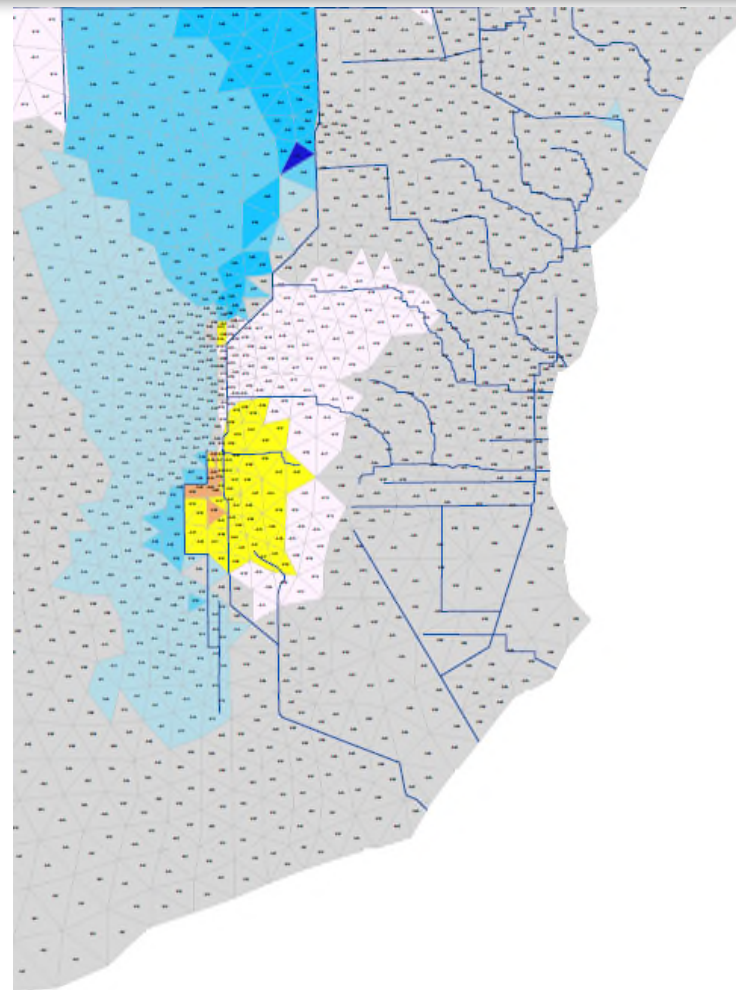
Add 200 cfs pump downstream of S178



Stage Difference Maps Compared to Increment 1 Wet Year (WY1970) : October

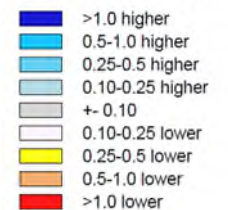


Step 2A0

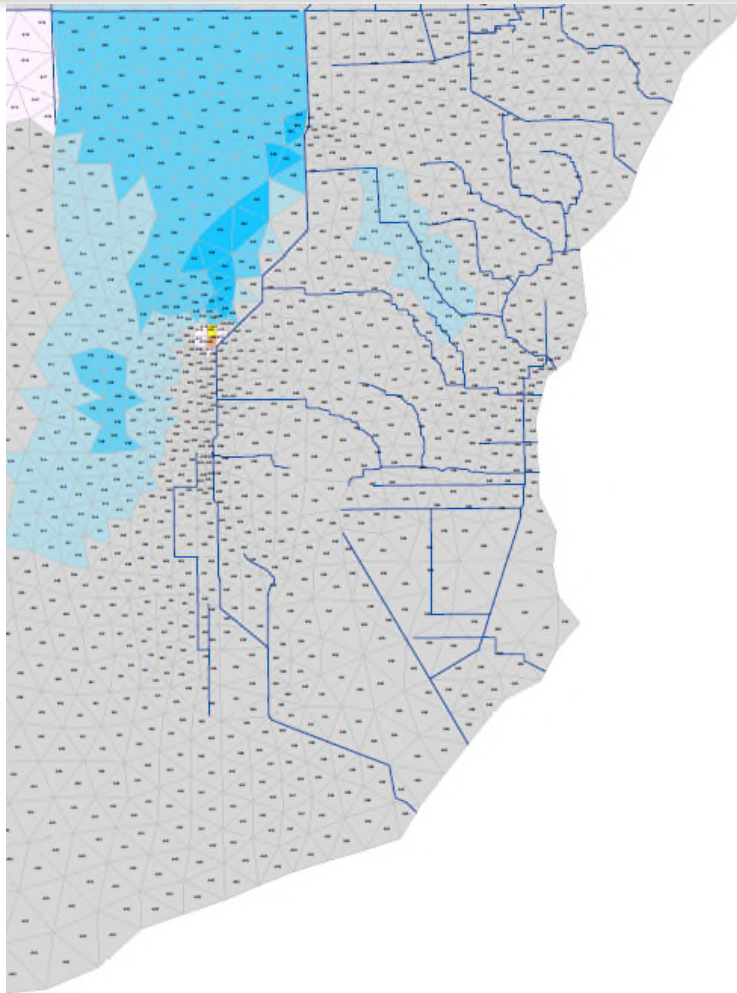


Step 2A3

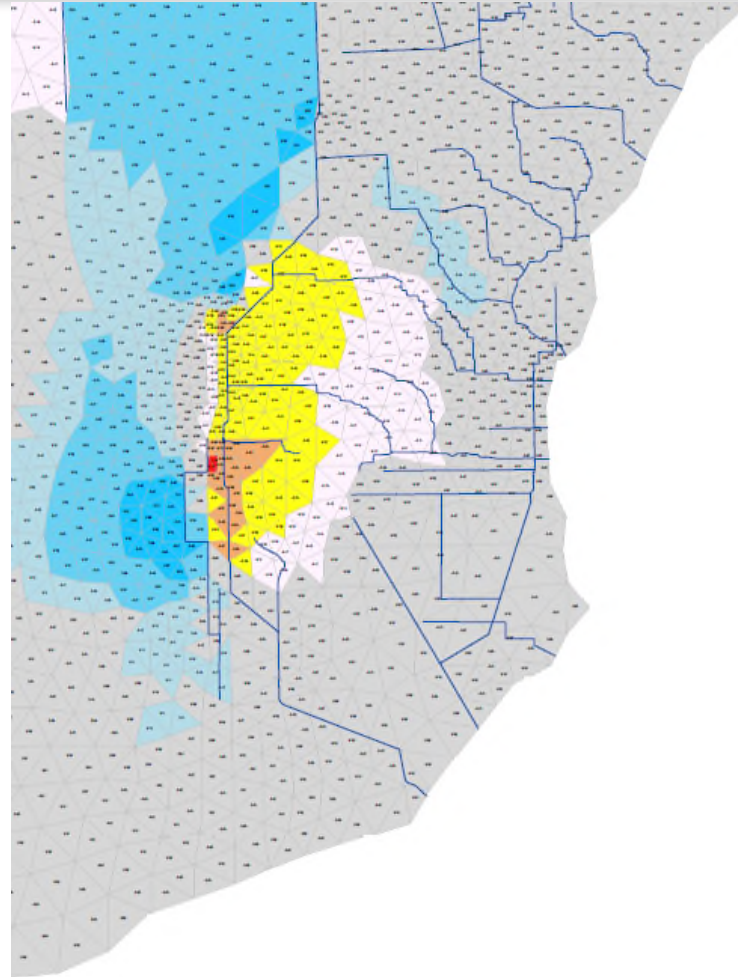
Stage Difference (ft)



Stage Difference Maps Compared to Increment 1 Dry Year (WY1971) : October

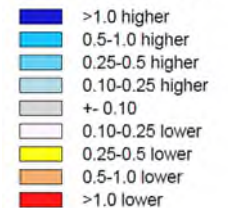


Step 2A0

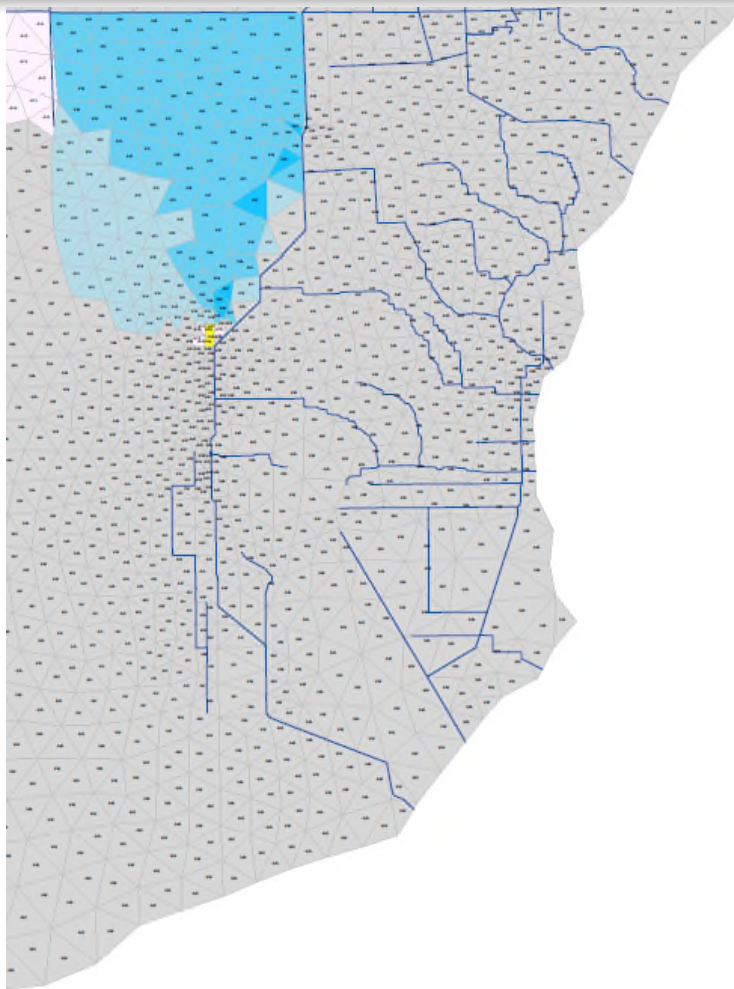


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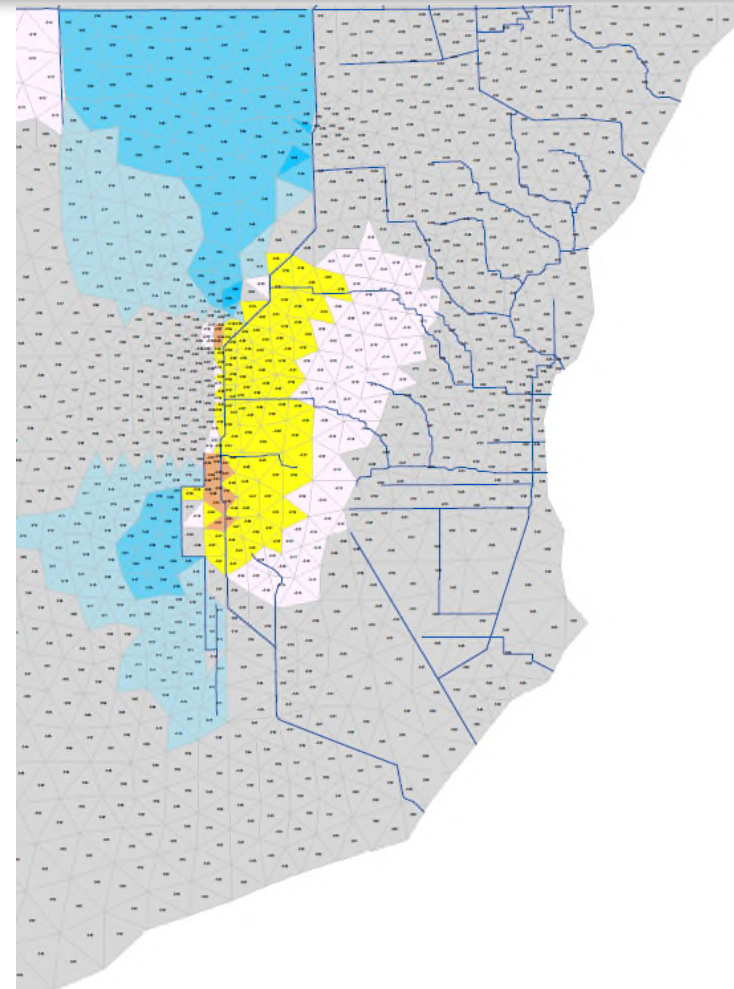
Stage Difference (ft)



Stage Difference Maps Compared to Increment 1 41 year average: October

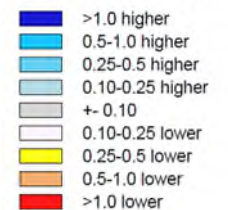


Step 2A0

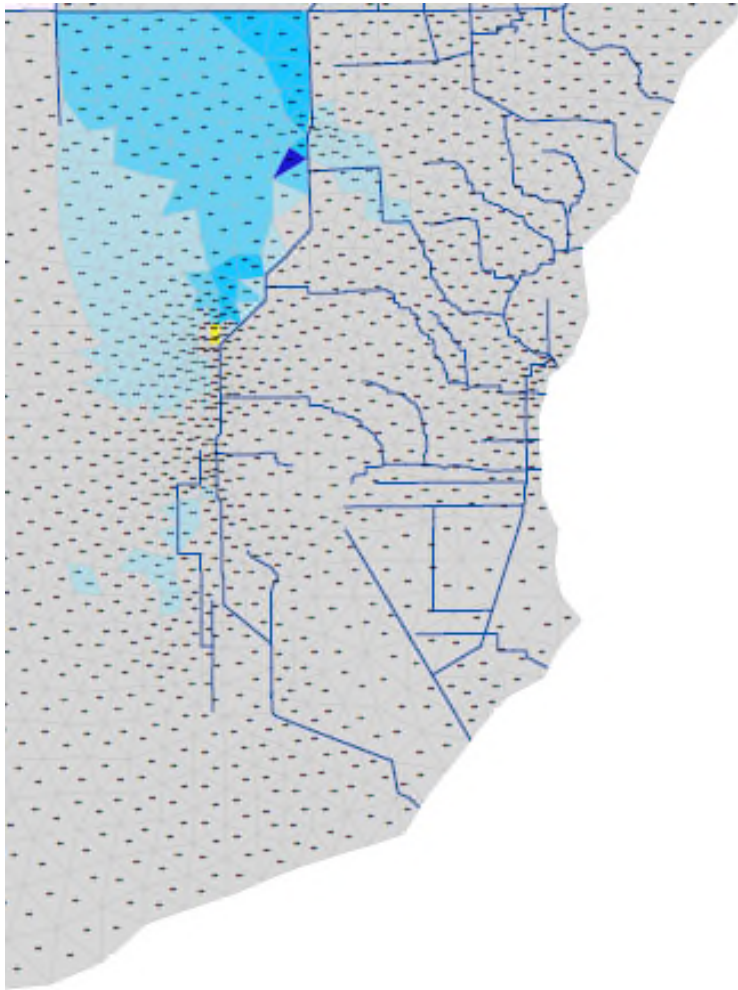


Step 2A3

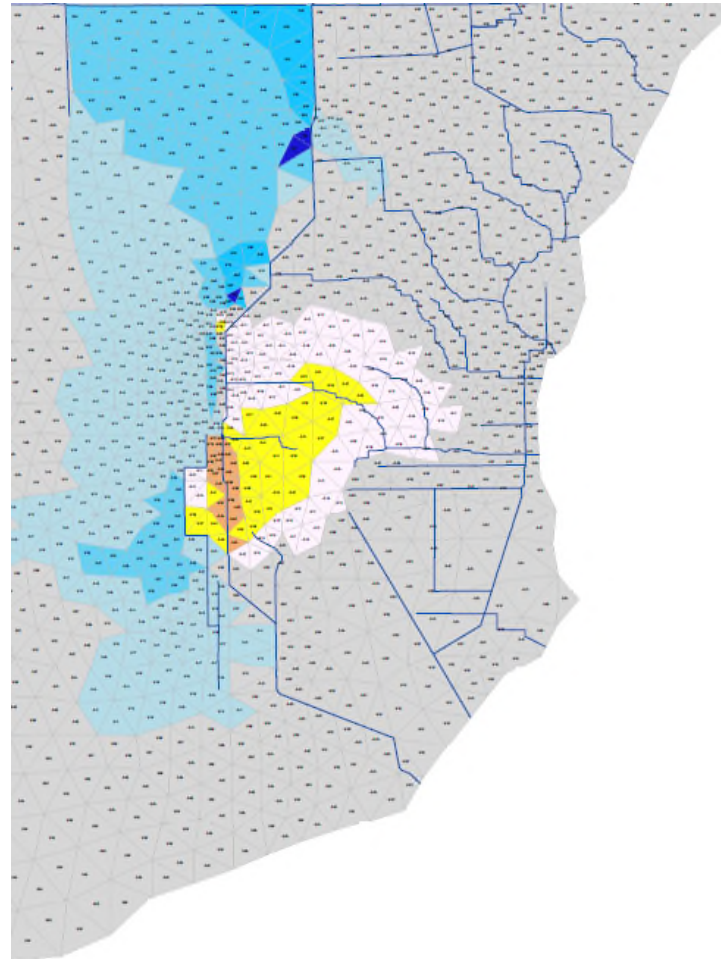
Stage Difference (ft)



Stage Difference Maps Compared to Increment 1 Wet Year (WY1970) : December

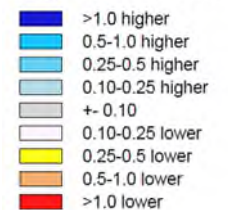


Step 2A0

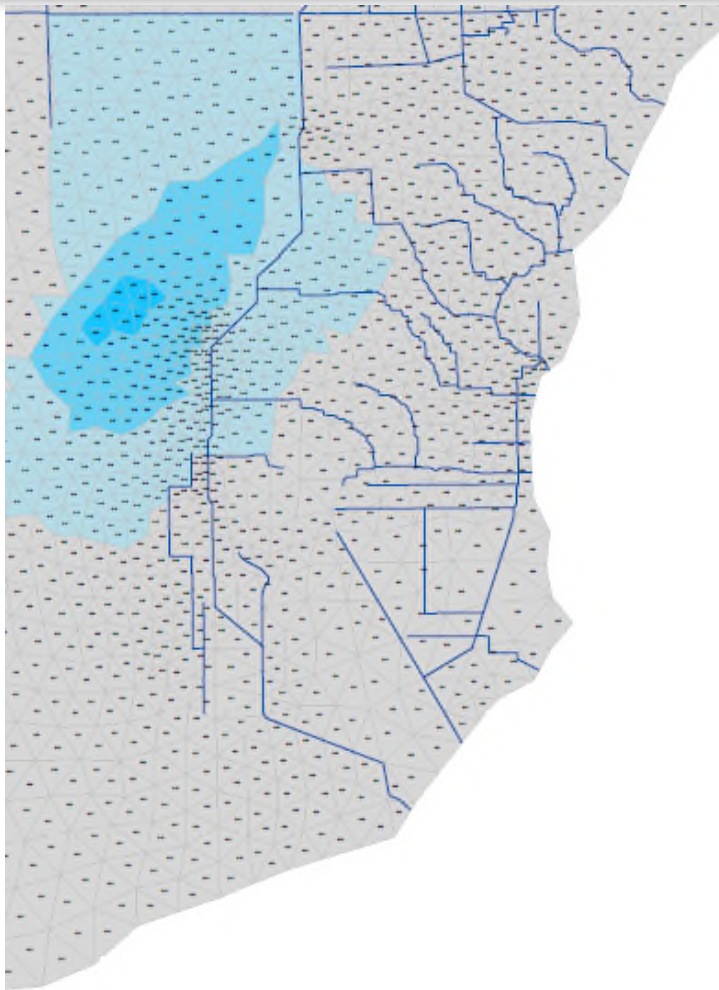


Step 2A3

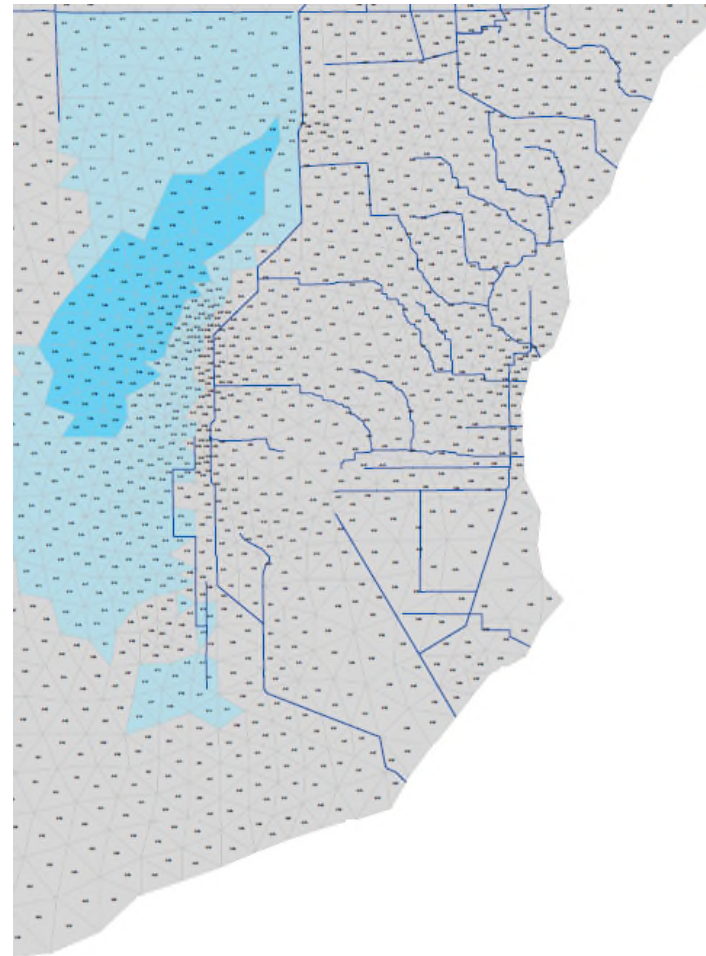
Stage Difference (ft)



Stage Difference Maps Compared to Increment 1 Dry Year (WY1971) : December

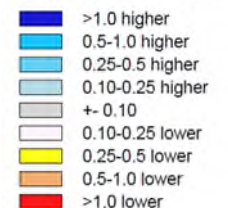


Step 2A0

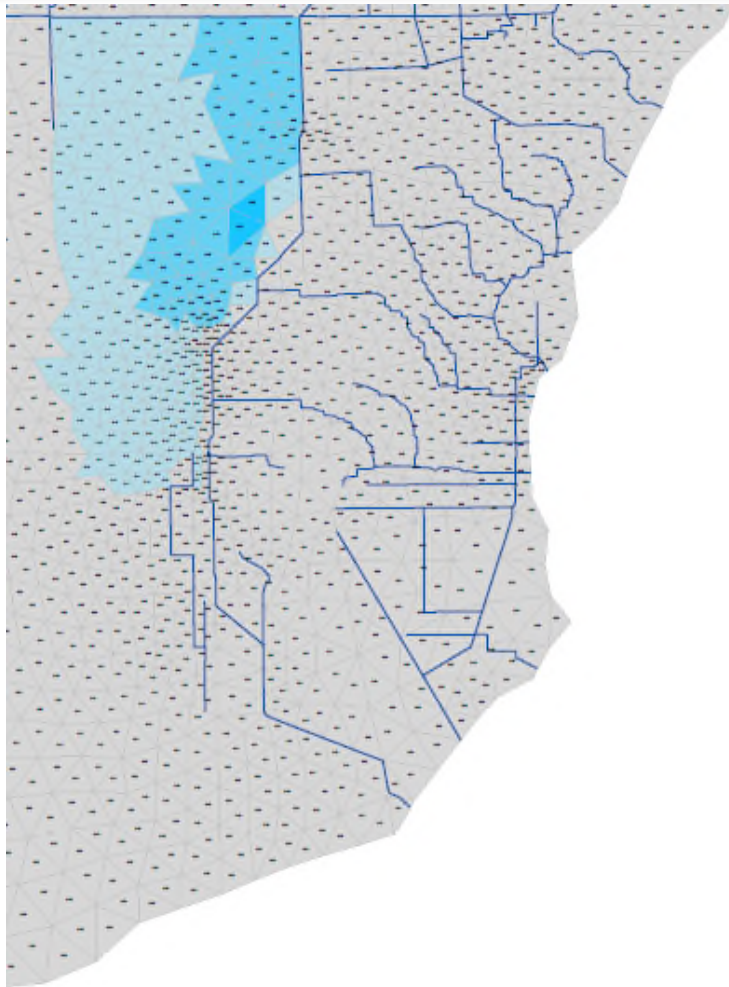


Step 2A3

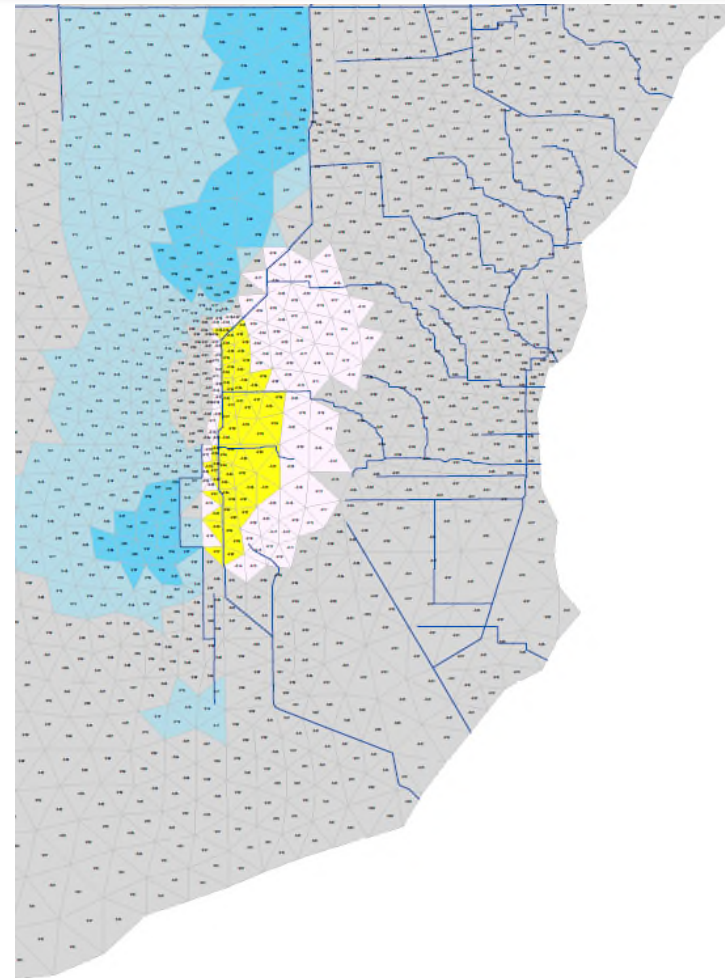
Stage Difference (ft)



Stage Difference Maps Compared to Increment 1 41 year average: December

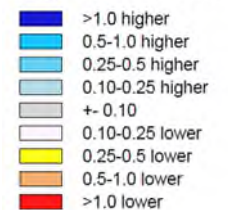


Step 2A0

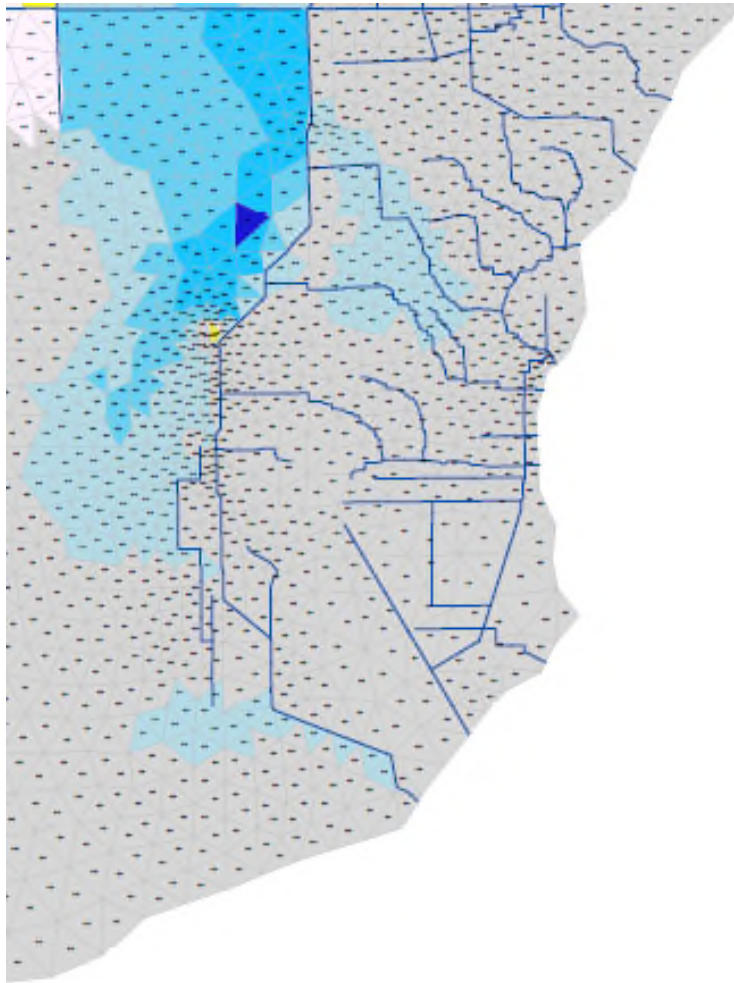


Step 2A3

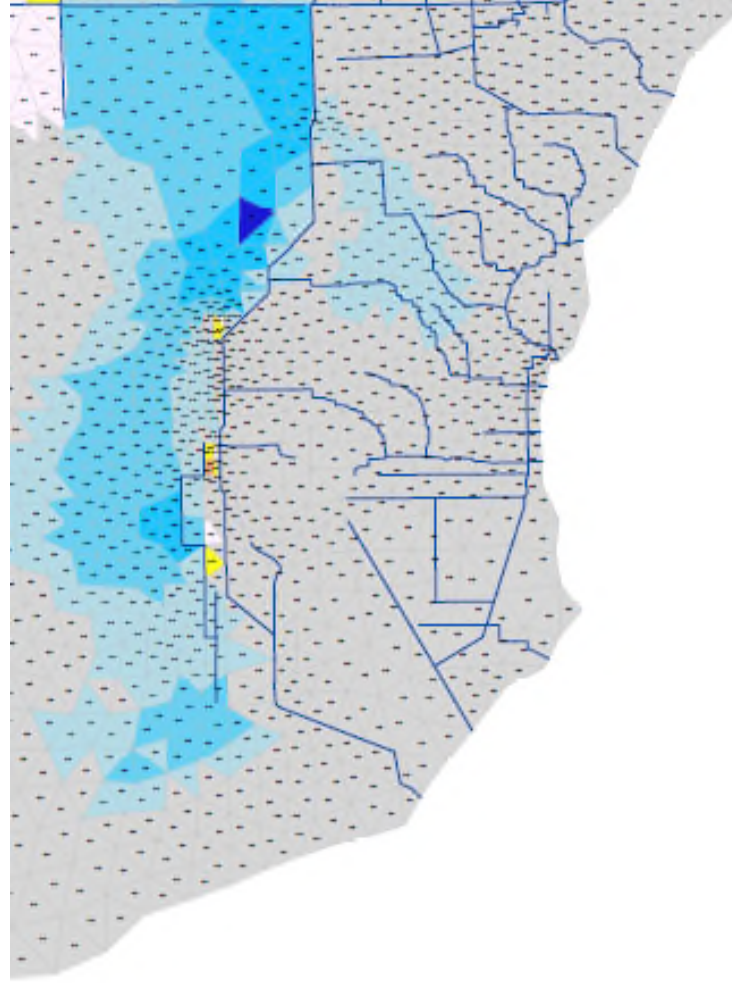
Stage Difference (ft)



Stage Difference Maps Compared to Increment 1 Wet Year (WY1970) : April



Step 2A0

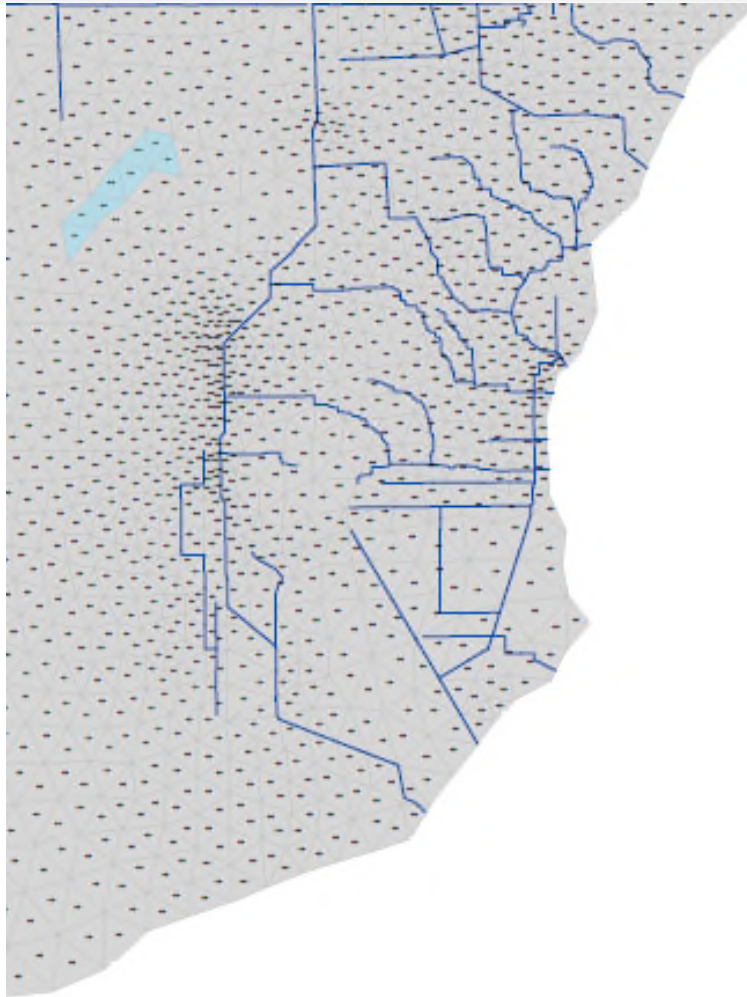


Step 2A3

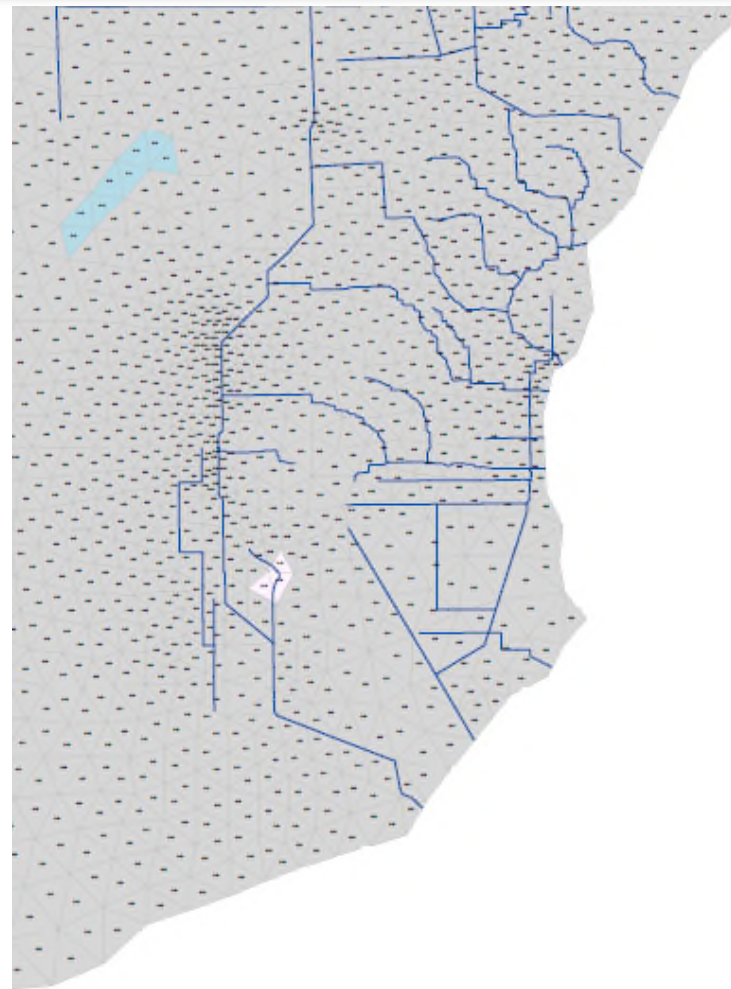
Stage Difference (ft)



Stage Difference Maps Compared to Increment 1 Dry Year (WY1971) : April

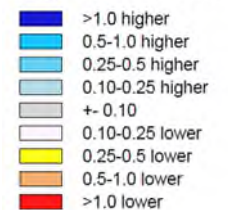


Step 2A0

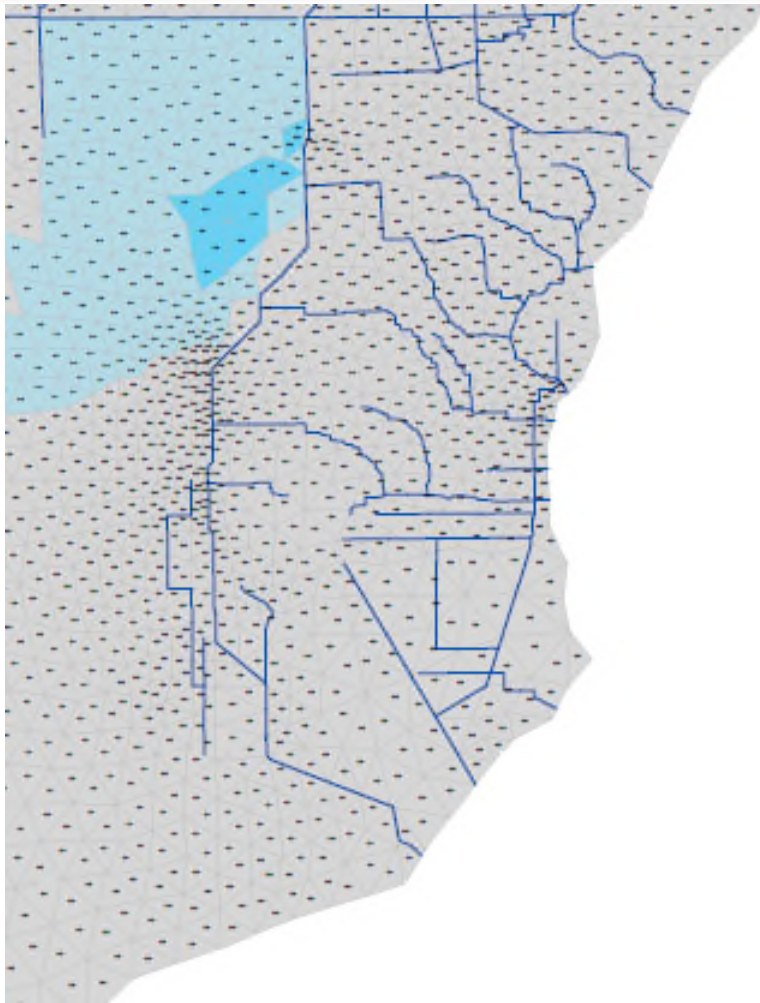


Step 2A3

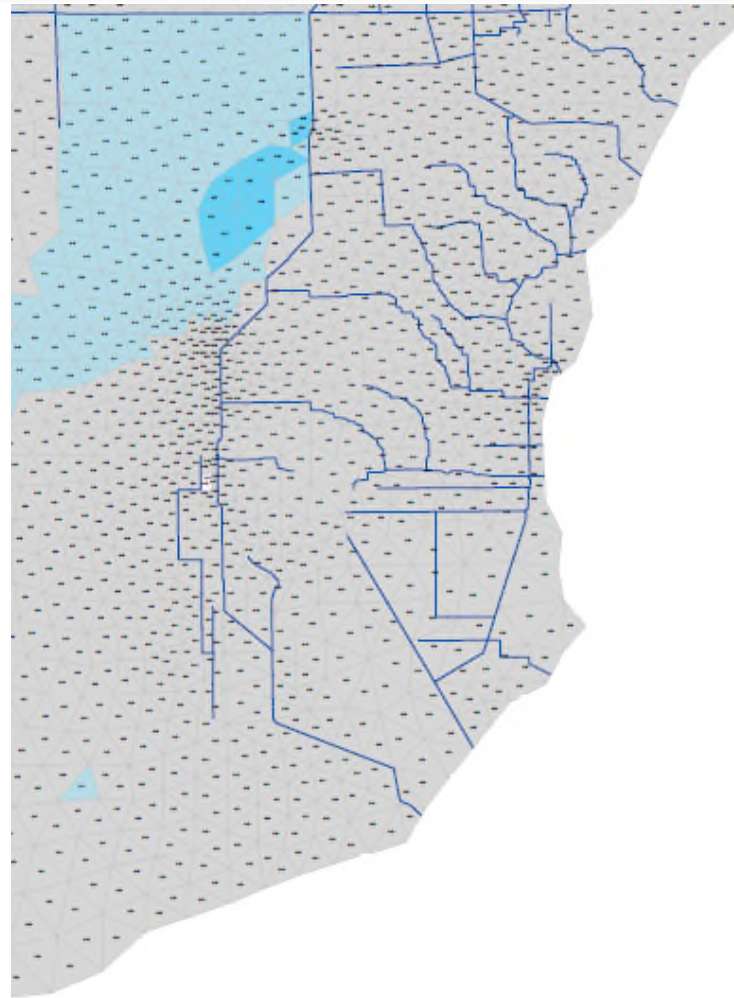
Stage Difference (ft)



Stage Difference Maps Compared to Increment 1 41 year average: April

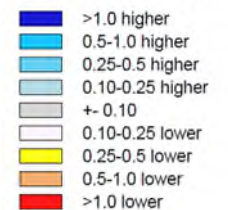


Step 2A0



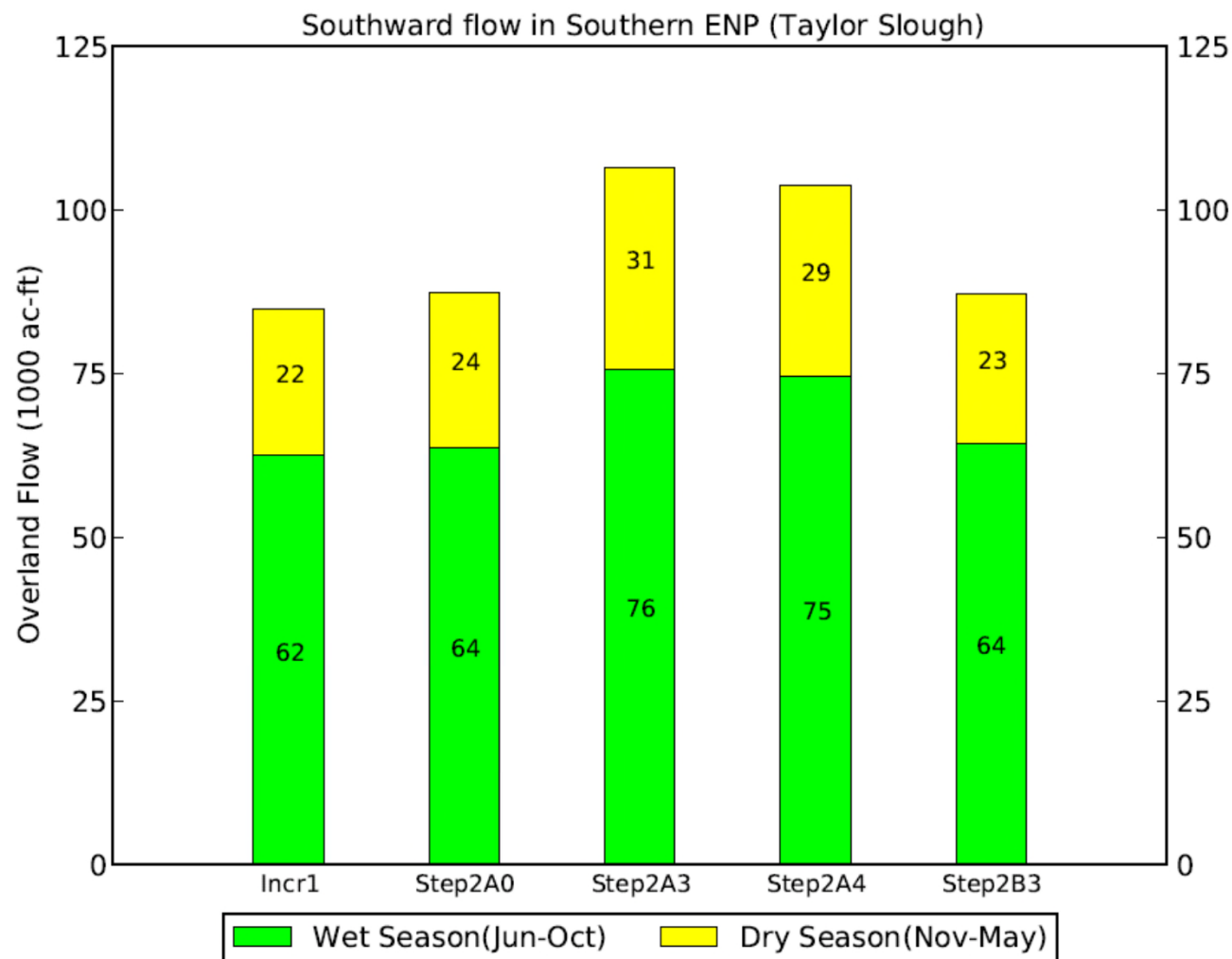
Step 2A3

Stage Difference (ft)

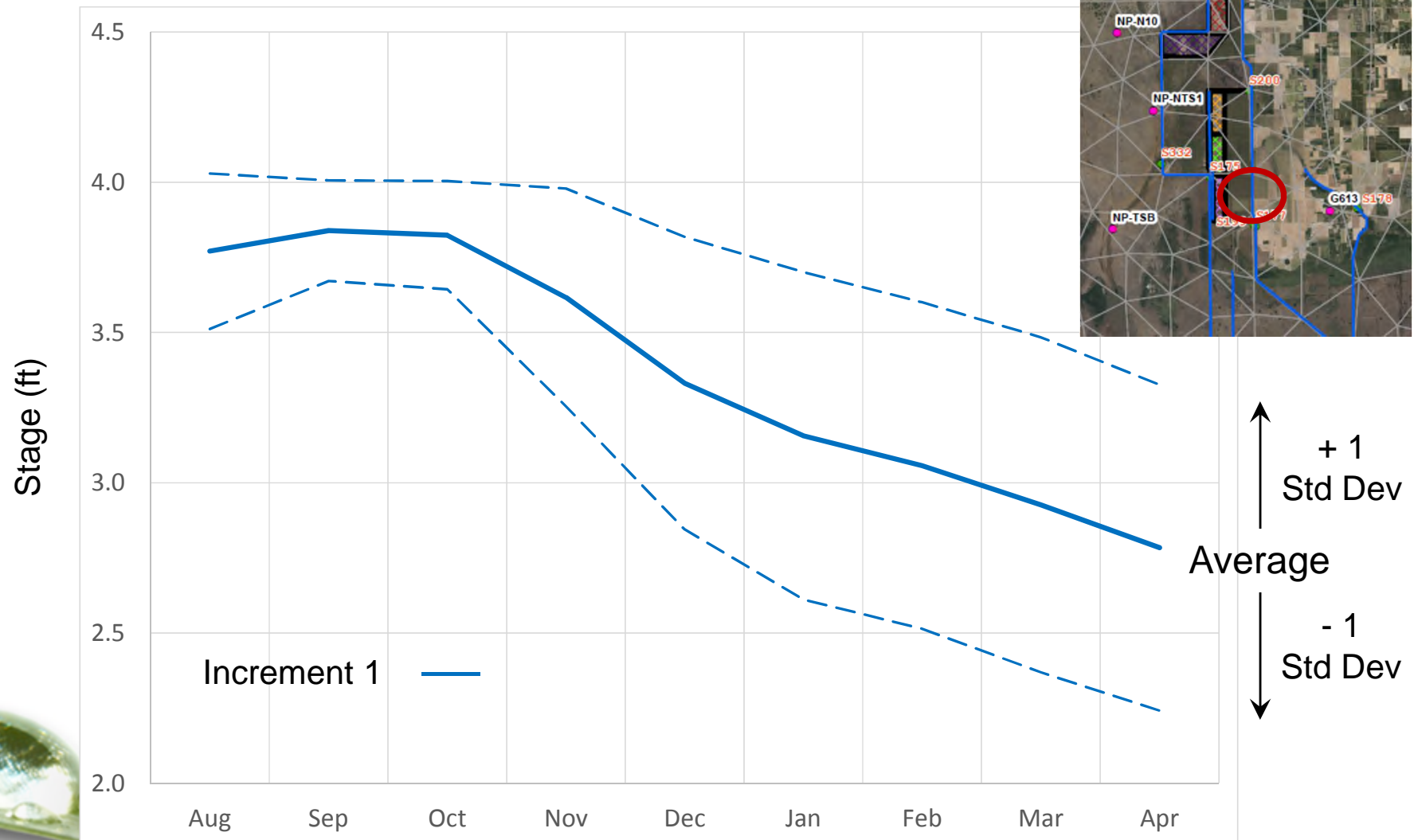


Flows Toward Taylor Slough

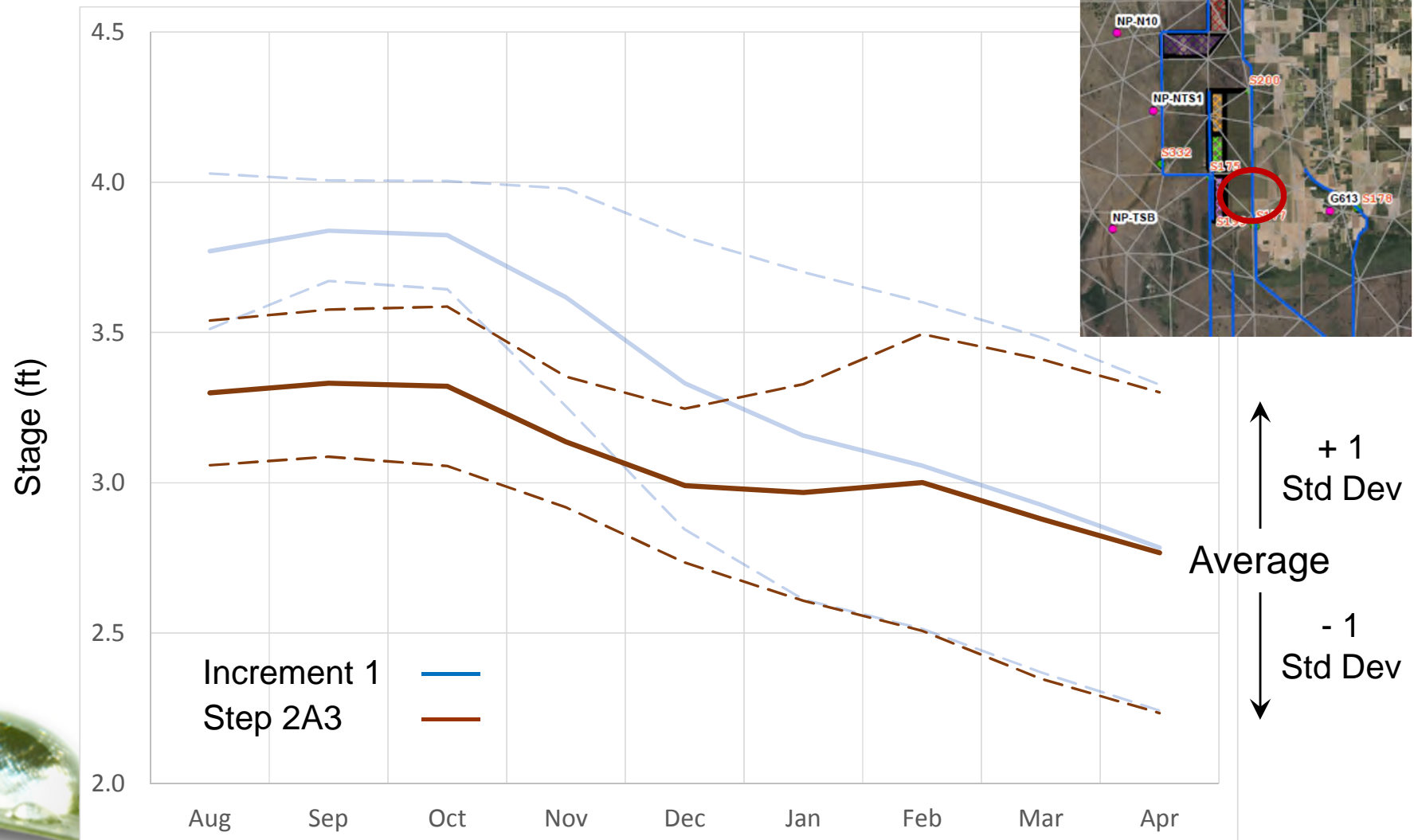
Average Annual Overland Flow across Transect 23B [01JAN1965 - 31DEC2005]



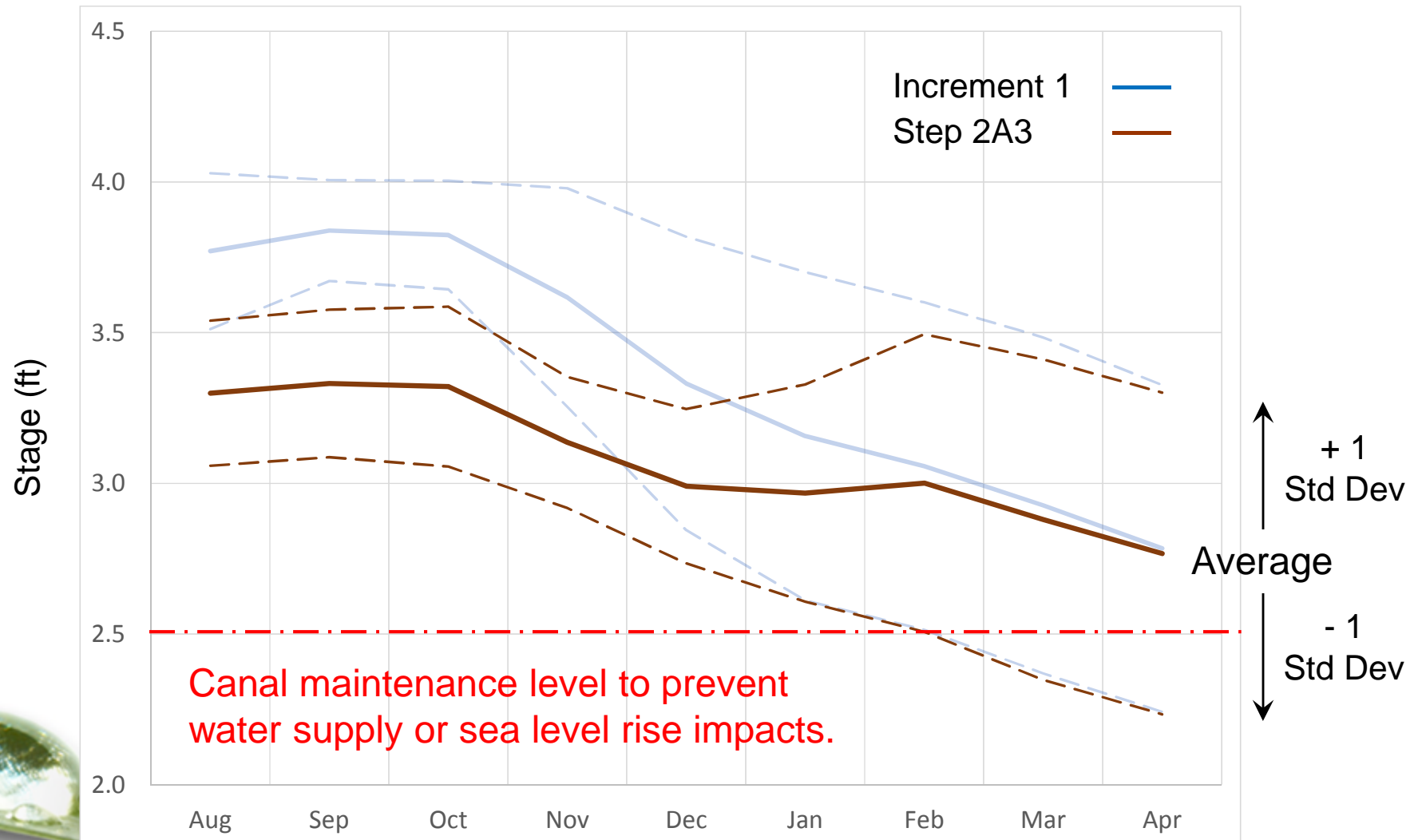
Seasonal Pattern in S177 Headwater



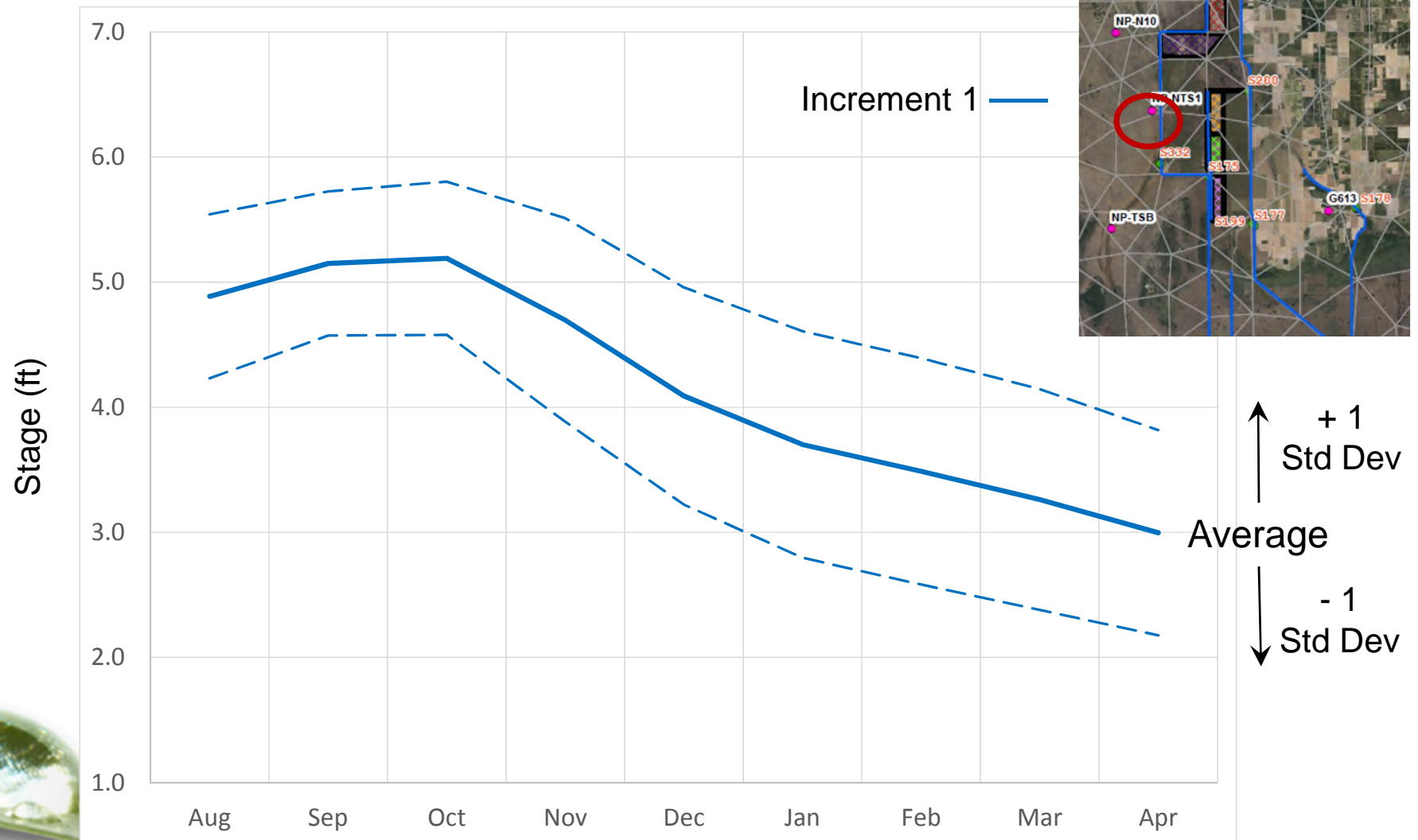
Seasonal Pattern in S177 Headwater



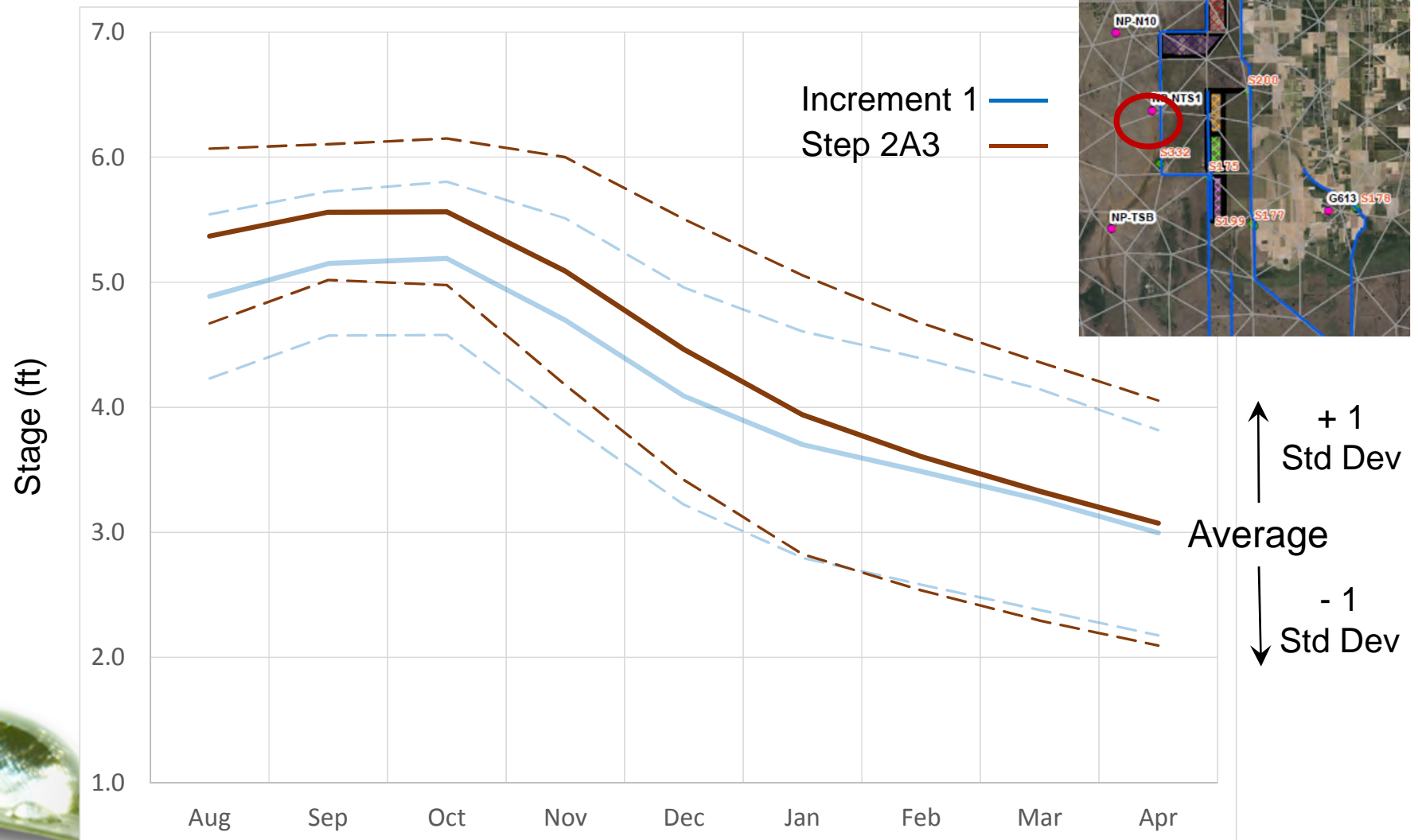
Seasonal Pattern in S177 Headwater



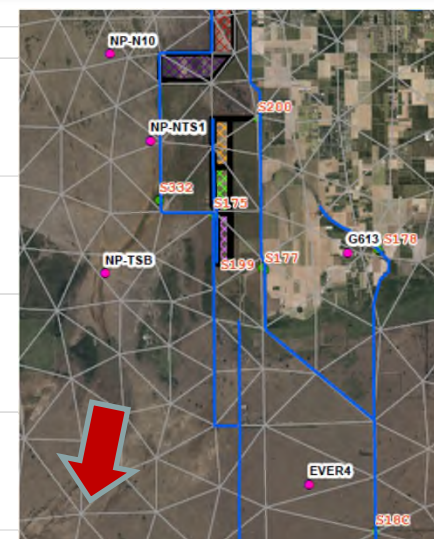
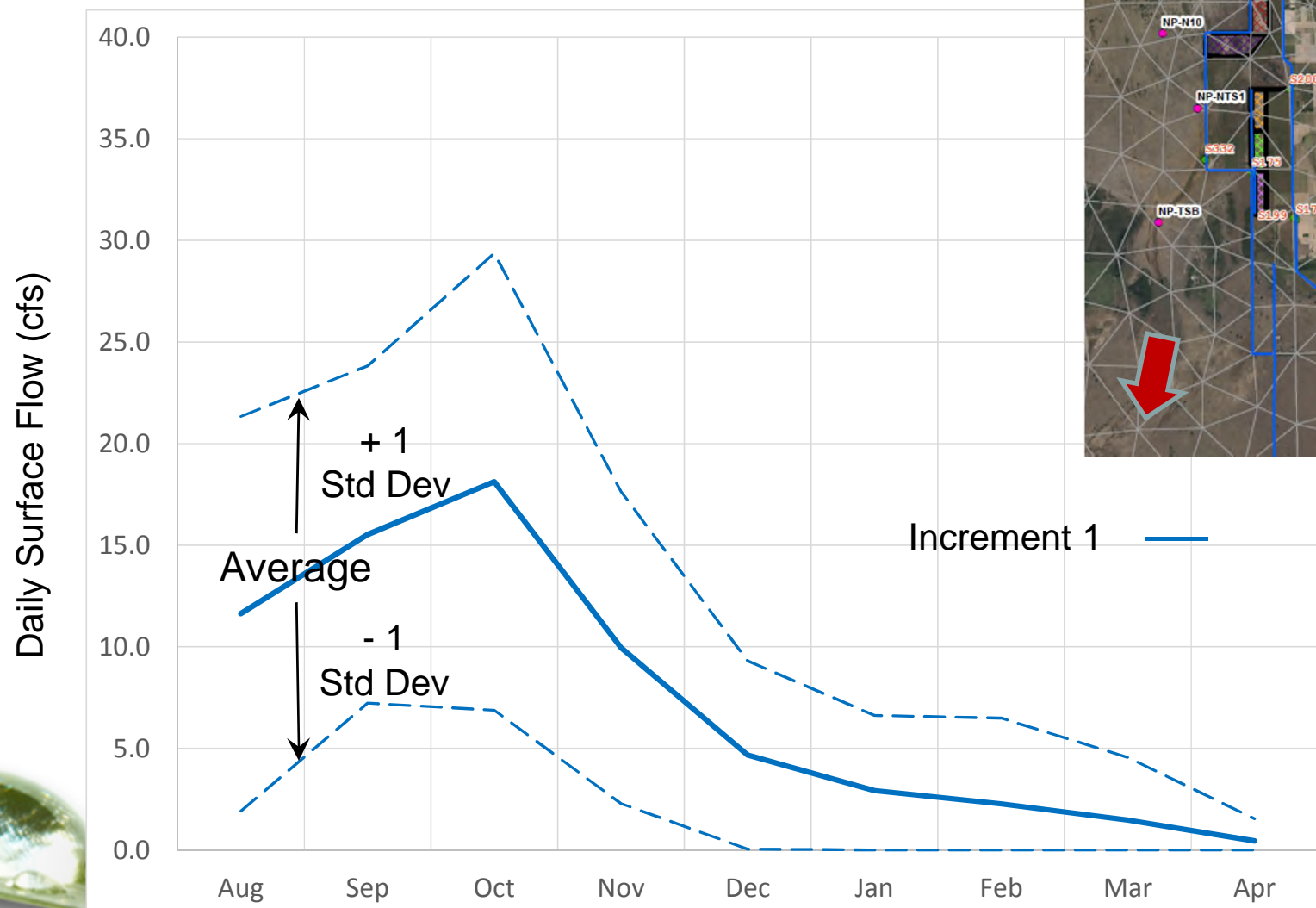
Seasonal Pattern at NTS1 (in Everglades National Park)



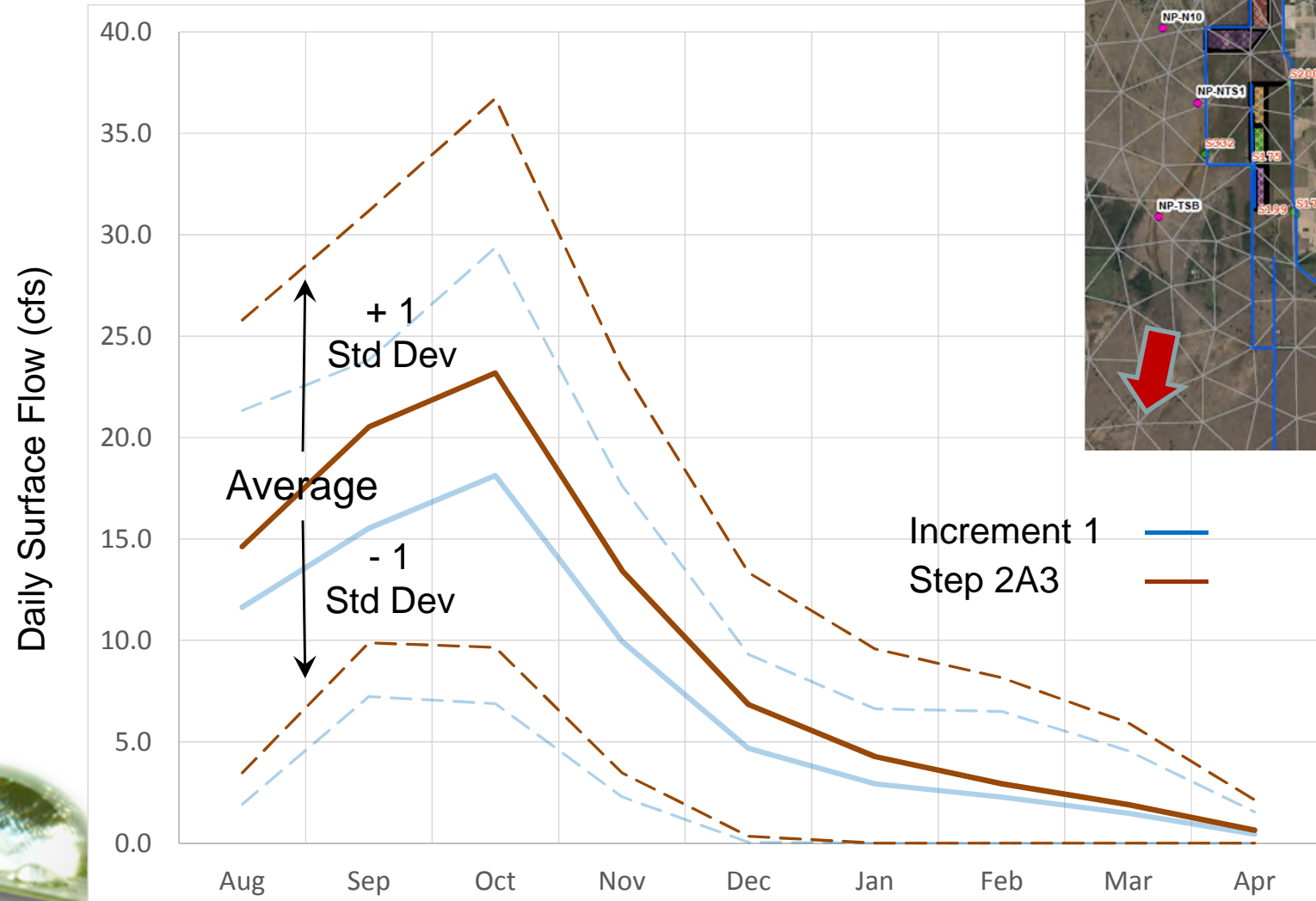
Seasonal Pattern at NTS1 (in Everglades National Park)



Seasonal Pattern in Taylor Slough Flows (Transect 23B)

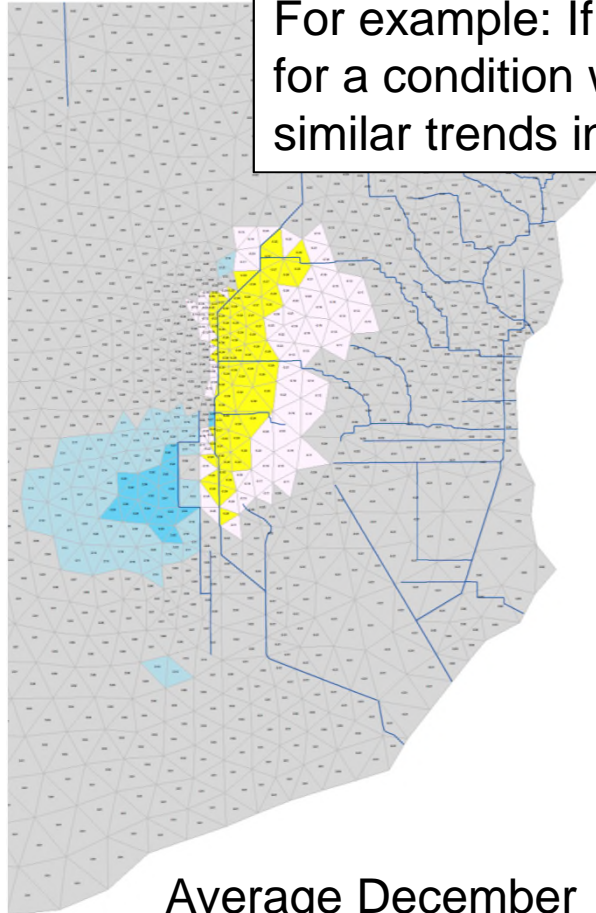


Seasonal Pattern in Taylor Slough Flows (Transect 23B)

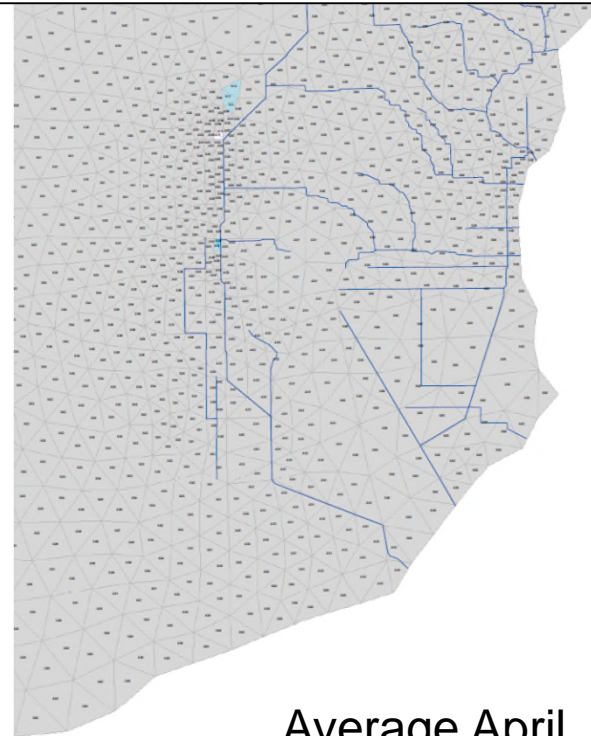


Premise of Operational Changes are Robust Across a Range of Conditions

For example: If changes similar to Step2A3 are analyzed for a condition where L29 is still constrained at 7.5 ft, similar trends in performance are observed.

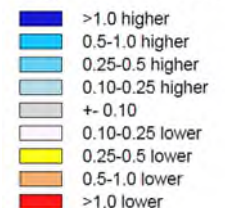


Average December
Step 2A3 with
L29 @ 7.5 ft



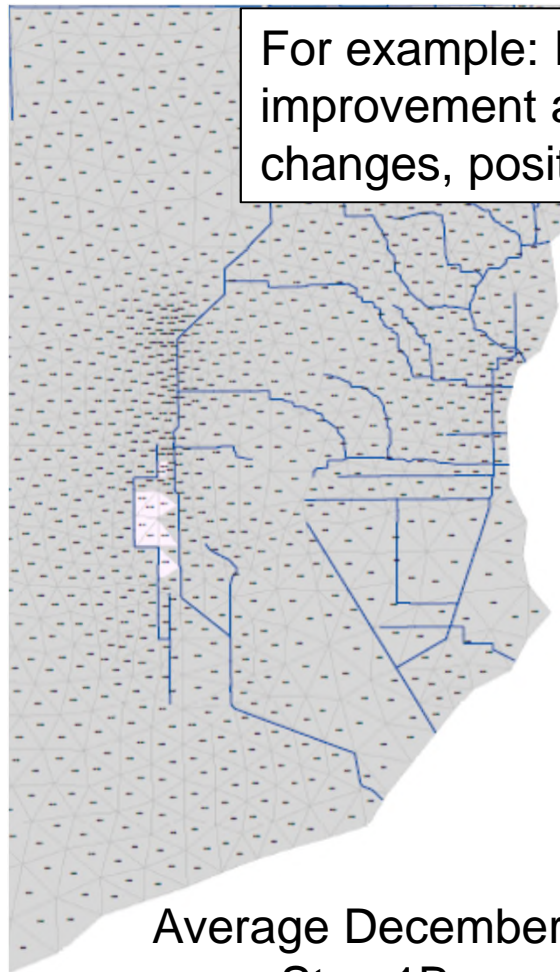
Average April
Step 2A3 with
L29 @ 7.5 ft

Stage Difference (ft)

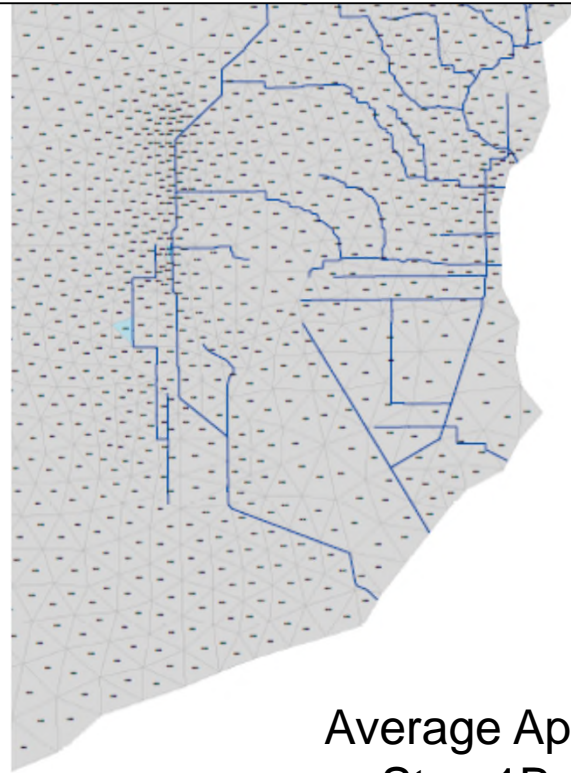


Premise of Operational Changes are Robust Across a Range of Conditions

For example: In a scenario with no infrastructure improvement and only limited, event-based operational changes, positive trends are observed with no impacts.

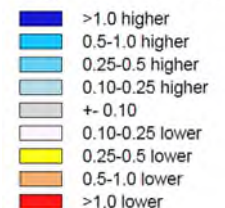


Average December
Step 1B



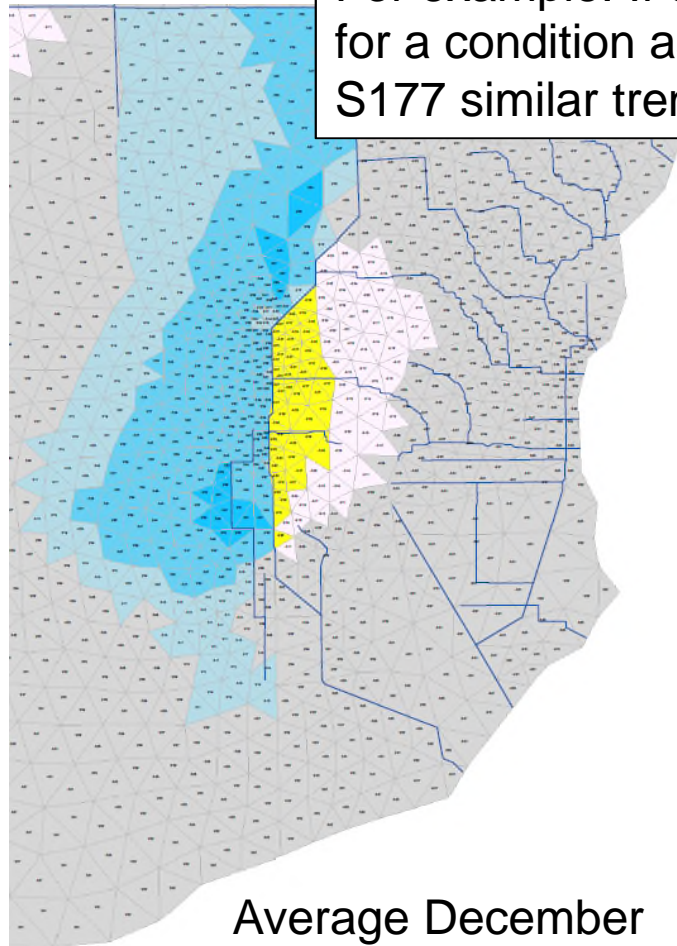
Average April
Step 1B

Stage Difference (ft)

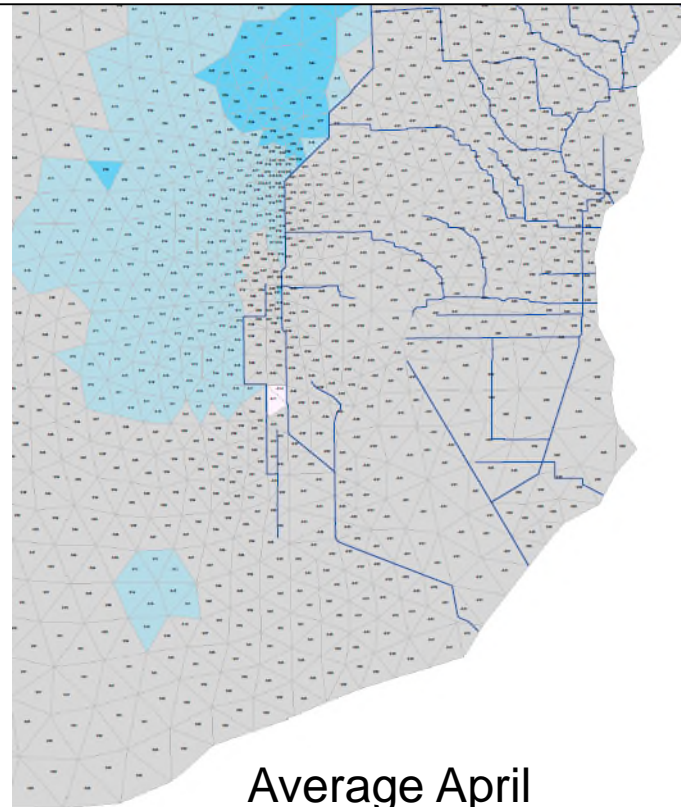


Premise of Operational Changes are Robust Across a Range of Conditions

For example: If changes similar to Step2A3 are analyzed for a condition assuming a seepage barrier from S331 to S177 similar trends in performance are observed.

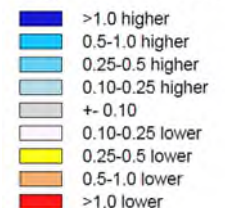


Average December
Step 3A2



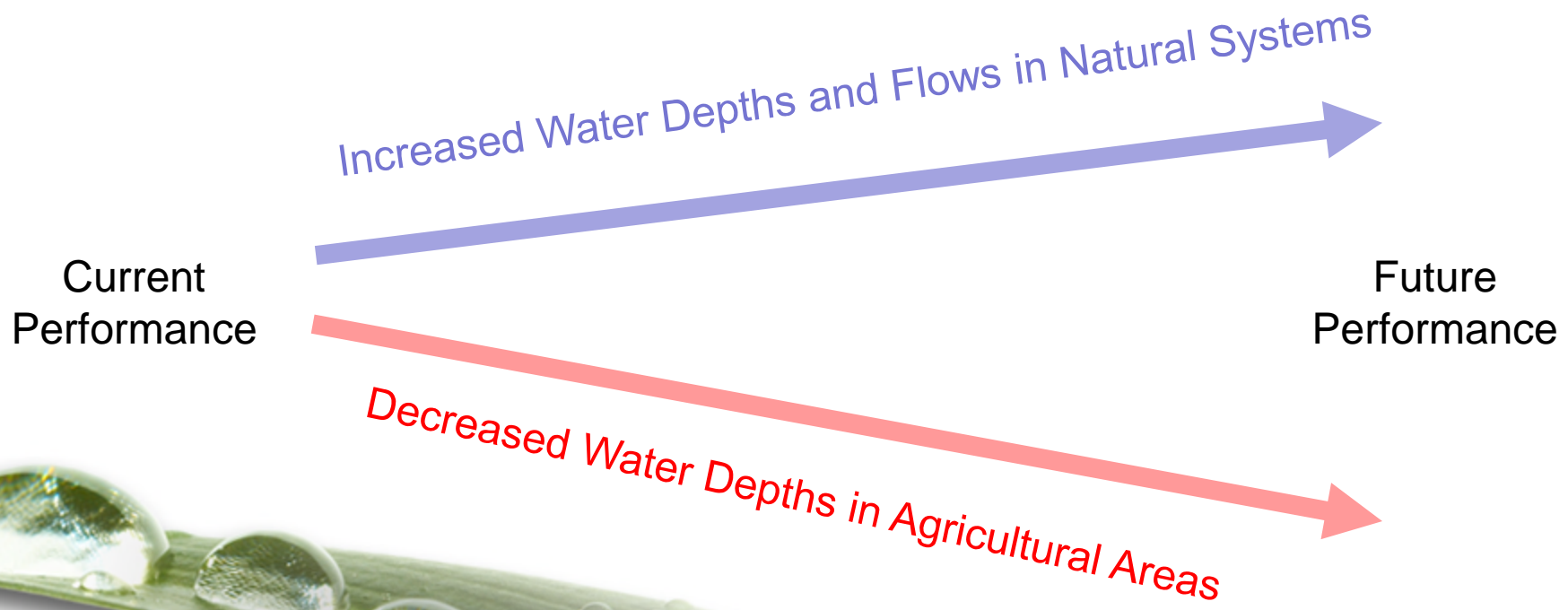
Average April
Step 3A2

Stage Difference (ft)

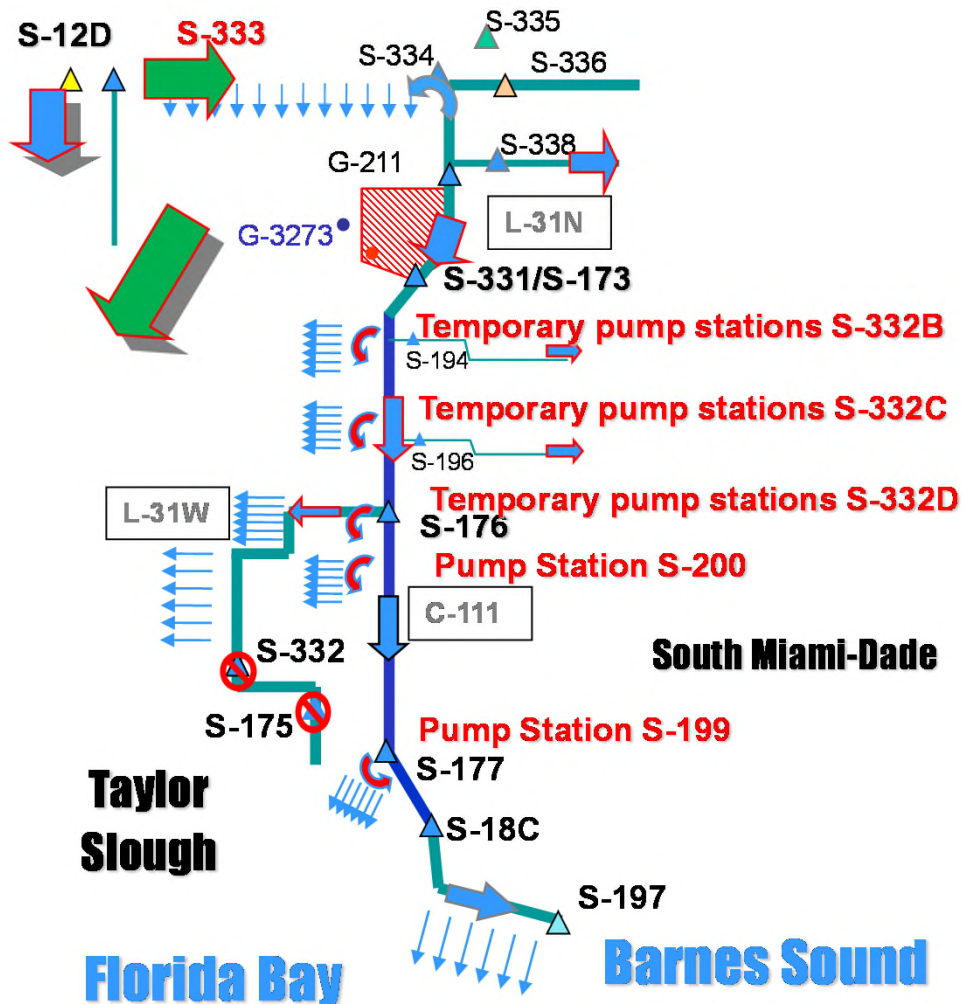


Improvement is Anticipated Along a Continuum

Moving forward, as opportunities are pursued to improve infrastructure or revisit operations in the South Dade area, the South Dade Investigations work has demonstrated that enhanced operations can leverage available infrastructure to move toward identified objectives and provide benefit to both managed and natural systems.



Why Does This Work?



- Rather than relying on flows primarily to the south (as in early operations of the SDCS) or primarily to the west (as in IOP or ERTTP), the operations demonstrated today balance the use of both sets of infrastructure
- Improvements in seasonal and event-based operations make these operations robust across a broad range of conditions and infrastructure.

QUESTIONS AND DISCUSSION

